V&V Reference Report
L2 ASCDS Version : 10.9.1

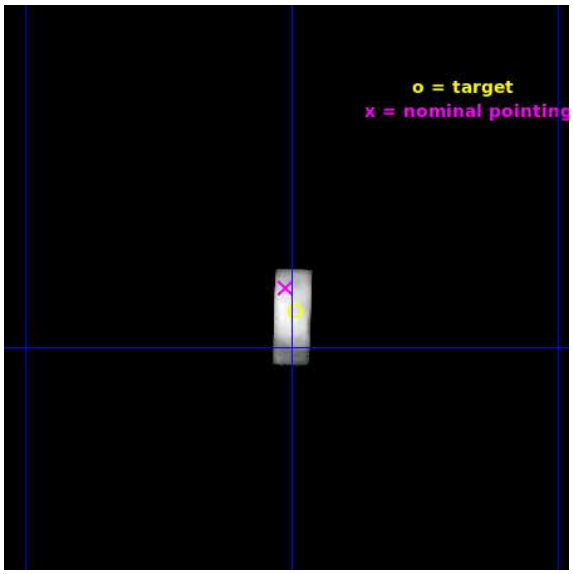
Observation 5285 - L2 Version 4
Chandra X-Ray Center

L2 Processing Date : Oct 3 2020

Contents

1 Front

seq_num	500502	Sequence number
obs_id	5285	Observation id
title	Spectroscopic Study of the Dynamic Shock in the Pulsar Wind of the Crab Nebula	Proposal title
observer	Dr Koji Mori	Principal investigator
object	Crab Nebula	Source name
dtycycle	0	
cycle	P	events from which exps? Prim/Second/Both
ra_targ	83.623083	Observer's specified target RA [deg]
dec_targ	22.016472	Observer's specified target Dec [deg]
ra_nom	83.627723644741	Nominal RA [deg]
dec_nom	22.026922751283	Nominal Dec [deg]
roll_nom	91.461264711117	Nominal Roll [deg]
revision	4	Processing version of data
ontime	10181.700404584	Sum of GTIs [s]
livetime	8956.4570765169	Livetime [s]
ontime7	10181.700404584	Sum of GTIs [s]
l2events	2388903	Number of level 2 events

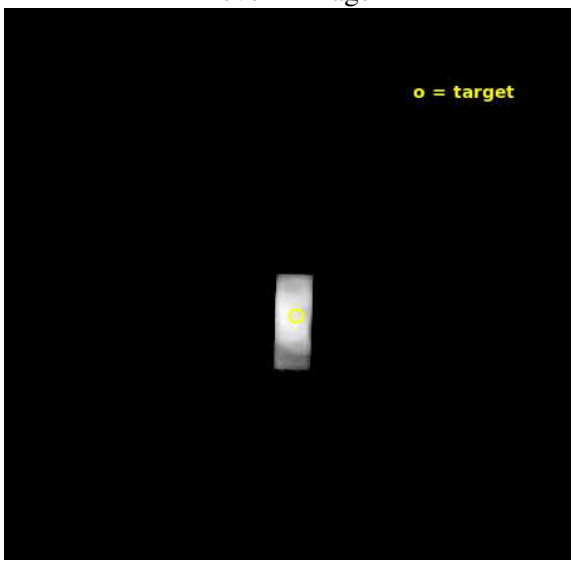


2 OBI

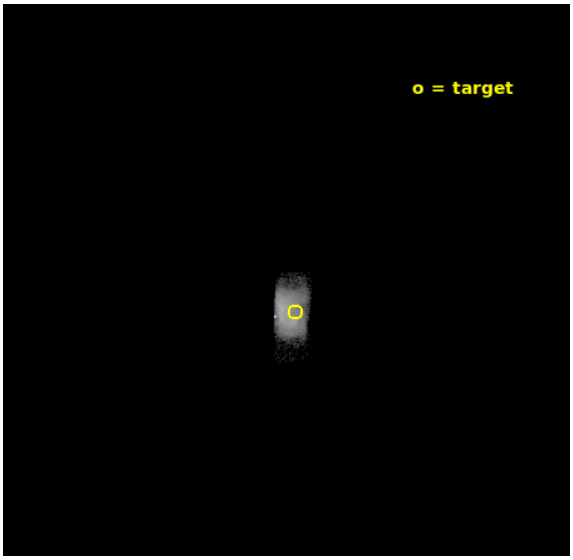
2.1 OBI

2.1.1 Images

Level 1 Image



Level 1 Bad Events



2.1.2 Parameters

obi_num	0	Obi number
ascdsver	10.9.1	Processing system revision
caldbver	4.9.2	
date	2020-10-04T00:02:33	Date and time of file creation
revision	4	Processing version of data

sched_exp_time	10000.000000	[s] Scheduled observation exposure time
ontime	10181.700404584	Sum of GTIs [s]
ontime7	10181.700404584	Sum of GTIs [s]
l1events	2526363	Number of level 1 events
tgmethod	FINDZO	Method used to create src1a file
zo_pos	(4102.51, 4014.14)	src1a sky pixel position
zo_pos_tgd	(4077.92, 4041.39)	src1a sky pixel position via tgdetect

2.1.3 Events

	ccd 7
level 1 events	2526363
rejected events	109957
rejected %	4%

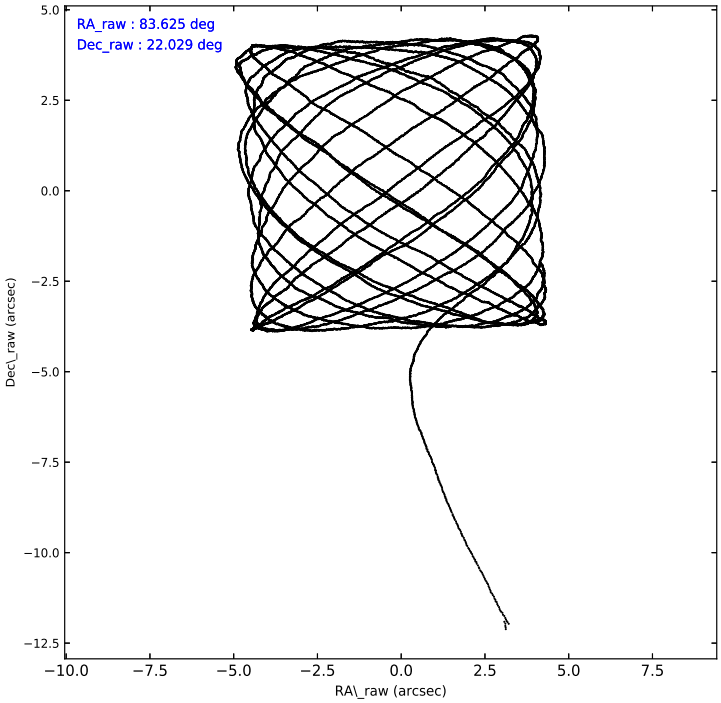
	ccd 7
grade 0 events	498290
	19%
grade 1 events	8297
	0%
grade 2 events	626757
	24%
grade 3 events	279864
	11%
grade 4 events	267190
	10%
grade 5 events	35474
	1%
grade 6 events	770630
	30%
grade 7 events	39861
	1%

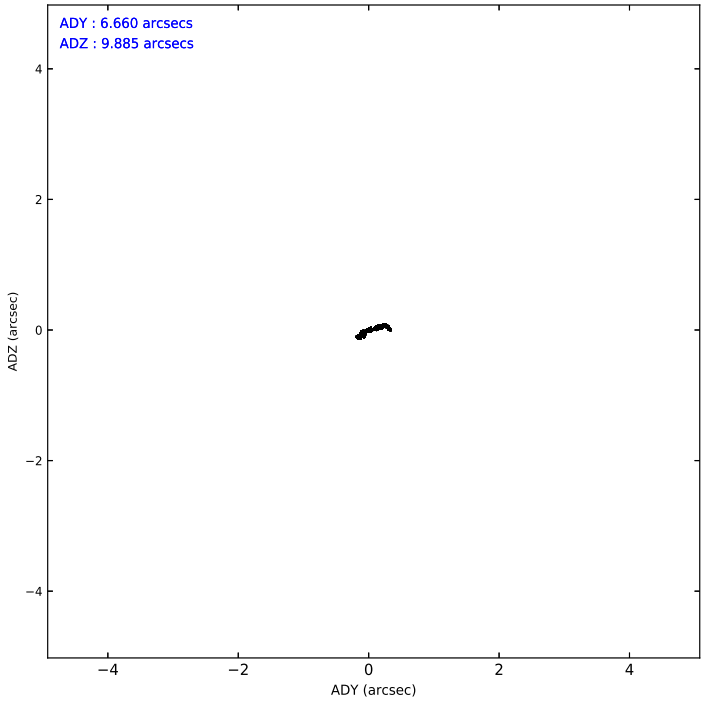
2.2 Compared Parameters

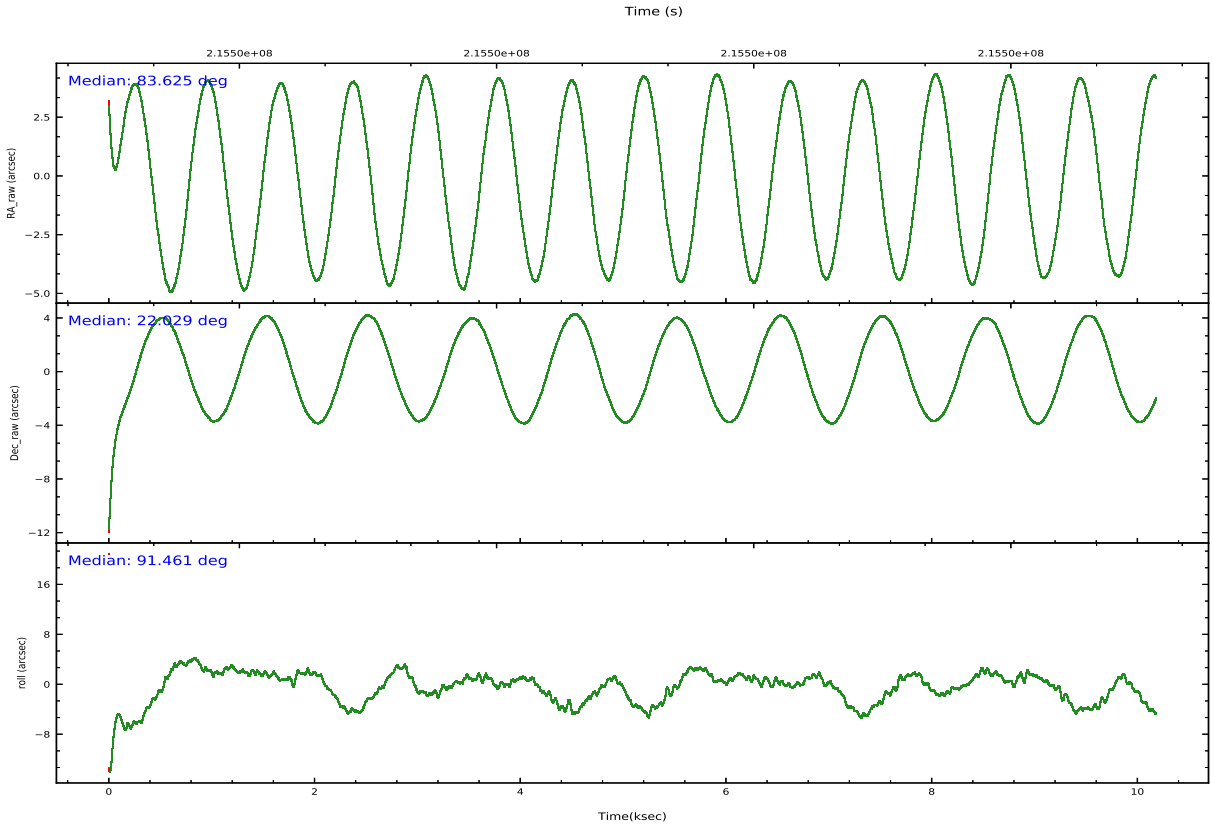
Parameter	Planned	Actual
Instrument	ACIS	ACIS
Detector	ACIS-7	ACIS-7
Grating	HETG	HETG
Data mode	GRADED	GRADED
Observation mode	POINTING	POINTING
[deg] Pointing RA	83.640251	83.627723644741
[deg] Pointing Dec	22.005838	22.026922751283
[deg] Pointing Roll	91.299790	91.461264711117
[mm] SIM focus pos	-0.684267	-0.6828225247311905
[mm] SIM defocus	0	0.001444936568705701
[mm] SIM translation stage pos	-182.132523	-182.1344861297048
[mm] SIM translation stage offset	-8	-7.998036453302973
[s] Observation start time (MET)	215493912.184000	215493059.38039
Observation start date	2004-10-30T03:24:08	2004-10-30T03:10:59
[s] Observation end time (MET)	215503912.184000	215505040.60593
Observation end date	2004-10-30T06:10:48	2004-10-30T06:30:40
Read mode	TIMED	TIMED

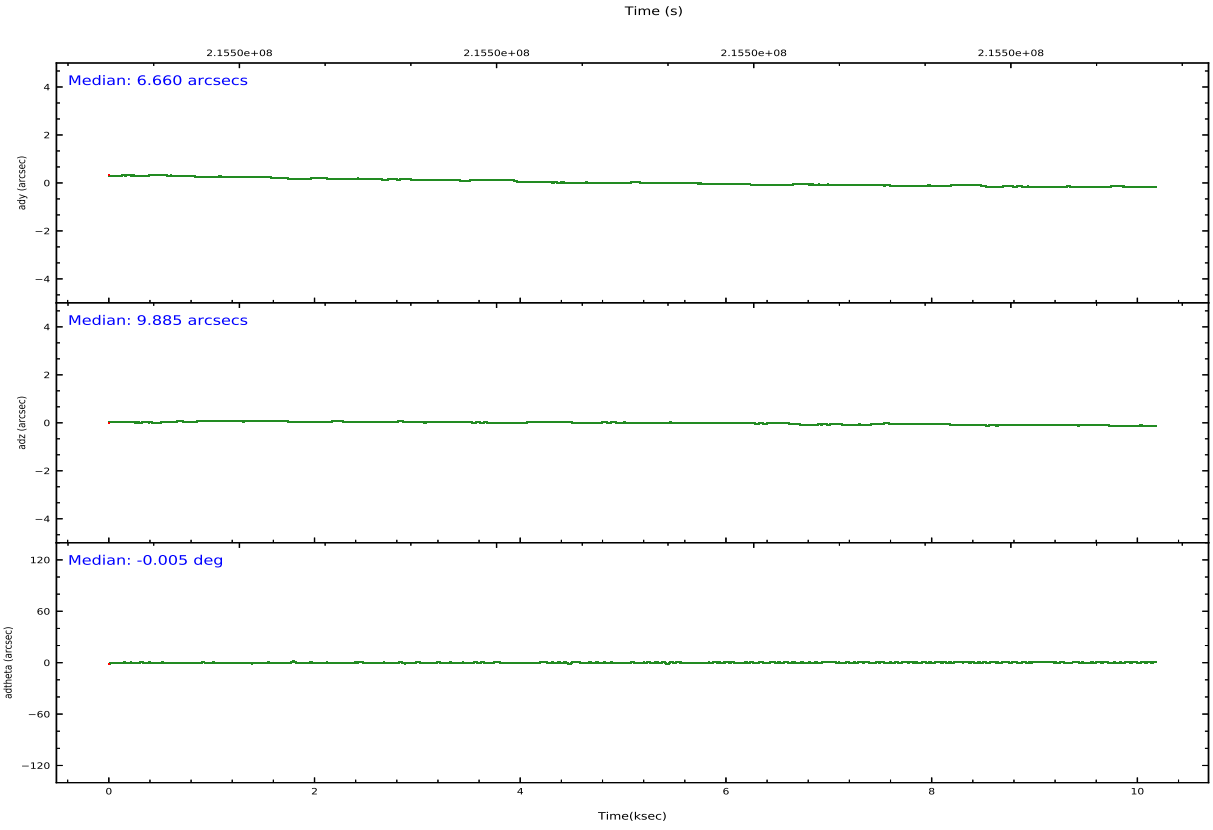
Parameter	Planned	Actual
Obspar version number	8	8
Obspar file type	PREDICTED	ACTUAL
Obspar update status	NONE	UPDATED
Number of optional ACIS chips dropped	0	0
On-chip summing requested	N	N
Subarray requested	CUSTOM	CUSTOM
Subarray start row	127	127
Subarray row count	101	101
Alternating exposures requested	N	N
[s] Primary exposure time	0.000000	0.3

2.3 Aspect


RA_raw : 83.625 deg
Dec_raw : 22.029 deg
Dec_raw (arcsec)
RA_raw (arcsec)
5.0
2.5
0.0
−2.5
−5.0
−7.5
−10.0
−12.5
−10.0
−7.5
−5.0
−2.5
0.0
2.5
5.0
7.5


ADY : 6.660 arcsecs
ADZ : 9.885 arcsecs
ADZ (arcsec)
ADY (arcsec)
4
2
0
−2
−4
−4
−2
0
2
4


Time (s)
2.1550e+08
2.1550e+08
2.1550e+08
2.1550e+08
Median: 83.625 deg
RA_raw (arcsec)
Median: 22.029 deg
Dec_raw (arcsec)
Median: 91.461 deg
roll (arcsec)
Time(ksec)

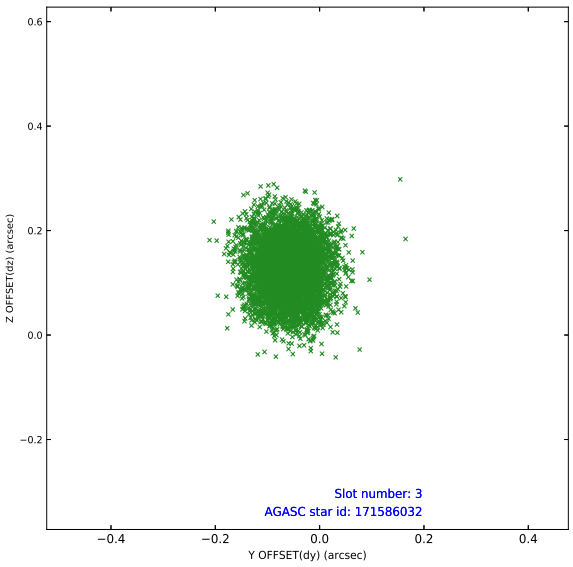

Time (s)
2.1550e+08
2.1550e+08
2.1550e+08
2.1550e+08
Median: 6.660 arcsecs
ady (arcsec)
Median: 9.885 arcsecs
adz (arcsec)
Median: -0.005 deg
adtheta (arcsec)
Time(ksec)

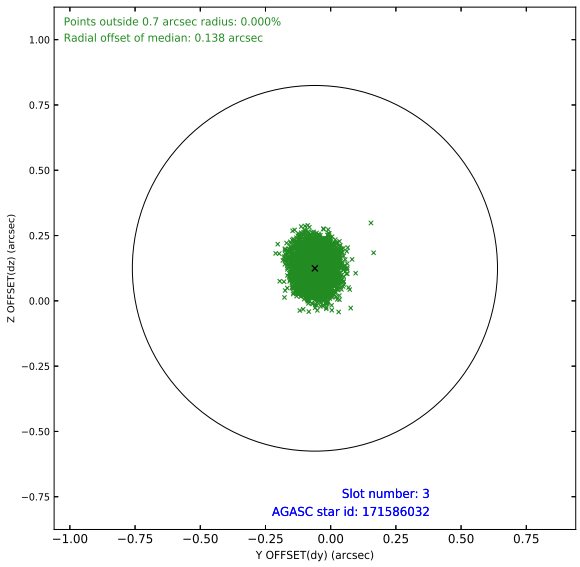
Slot Statistics

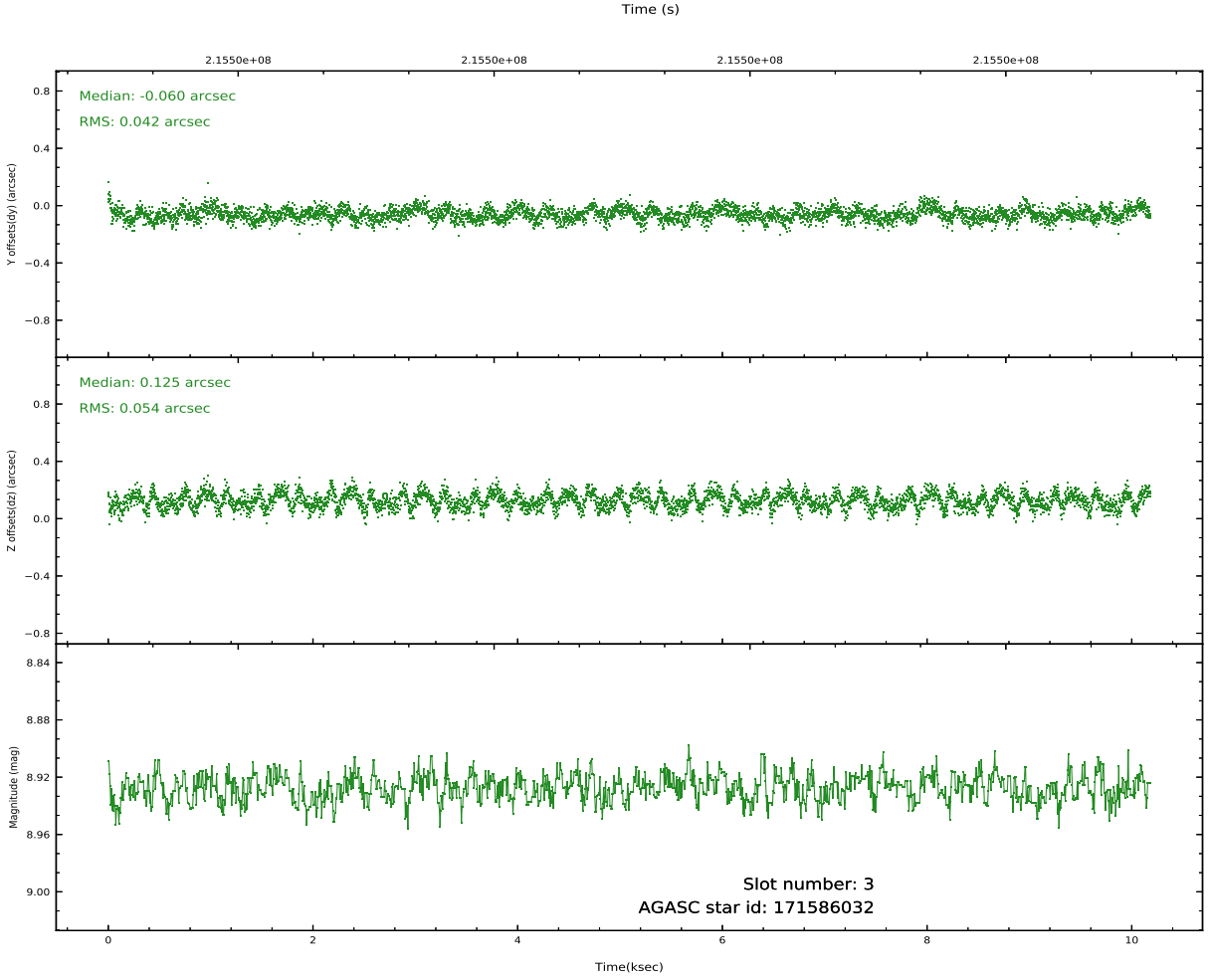
ot	status	used	id	mag	n_pts	frac_pts	med_dy	med_dz	dr1	dr2	ra	dec	mean_y	mea
0	FID		ACIS-S-2	7.09	2484	1.000	-0.113	-0.131	0.007	0.011	0.000000	0.000000	-758.94	-1896
1	FID		ACIS-S-4	7.18	2484	1.000	0.196	0.089	0.008	0.013	0.000000	0.000000	2154.38	12
2	FID		ACIS-S-5	7.22	2483	1.000	-0.115	0.049	0.007	0.012	0.000000	0.000000	-1811.15	6
3	GUIDE	used	171586032	8.93	4964	1.000	-0.060	0.125	0.074	0.116	83.950197	22.083225	256.57	-1039
4	GUIDE	used	171597832	9.15	4908	1.000	0.166	-0.124	0.089	0.143	83.183230	21.366702	-2262.79	1583
5	GUIDE	used	171721904	9.21	4965	1.000	-0.084	0.110	0.089	0.144	84.272676	22.116922	356.48	-2117
6	GUIDE	used	243941560	8.32	4967	1.000	-0.116	0.085	0.054	0.089	83.733264	22.568598	2018.87	-354
7	GUIDE	used	171600224	9.67	4964	1.000	0.093	-0.198	0.111	0.172	82.941815	21.636094	-1271.78	2366

2.4 Star Slots

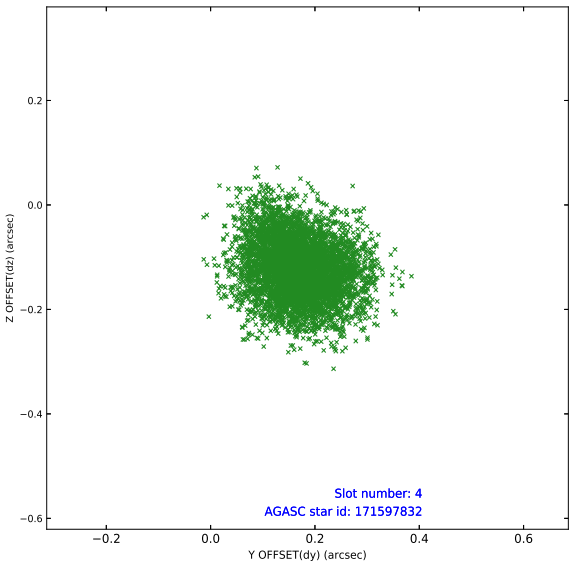
2.4.1 Slot 3

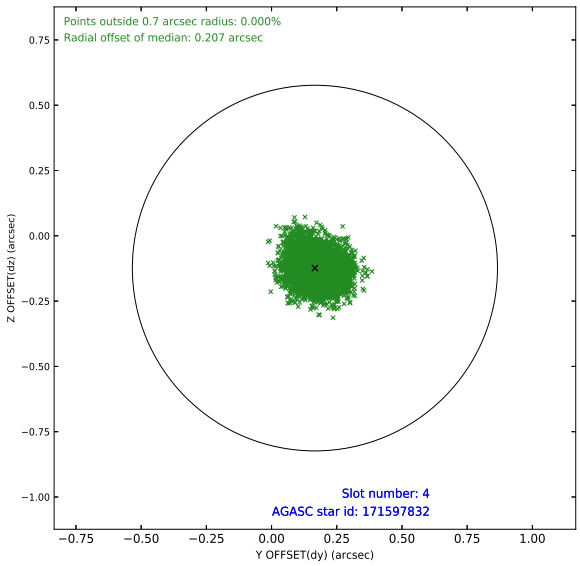


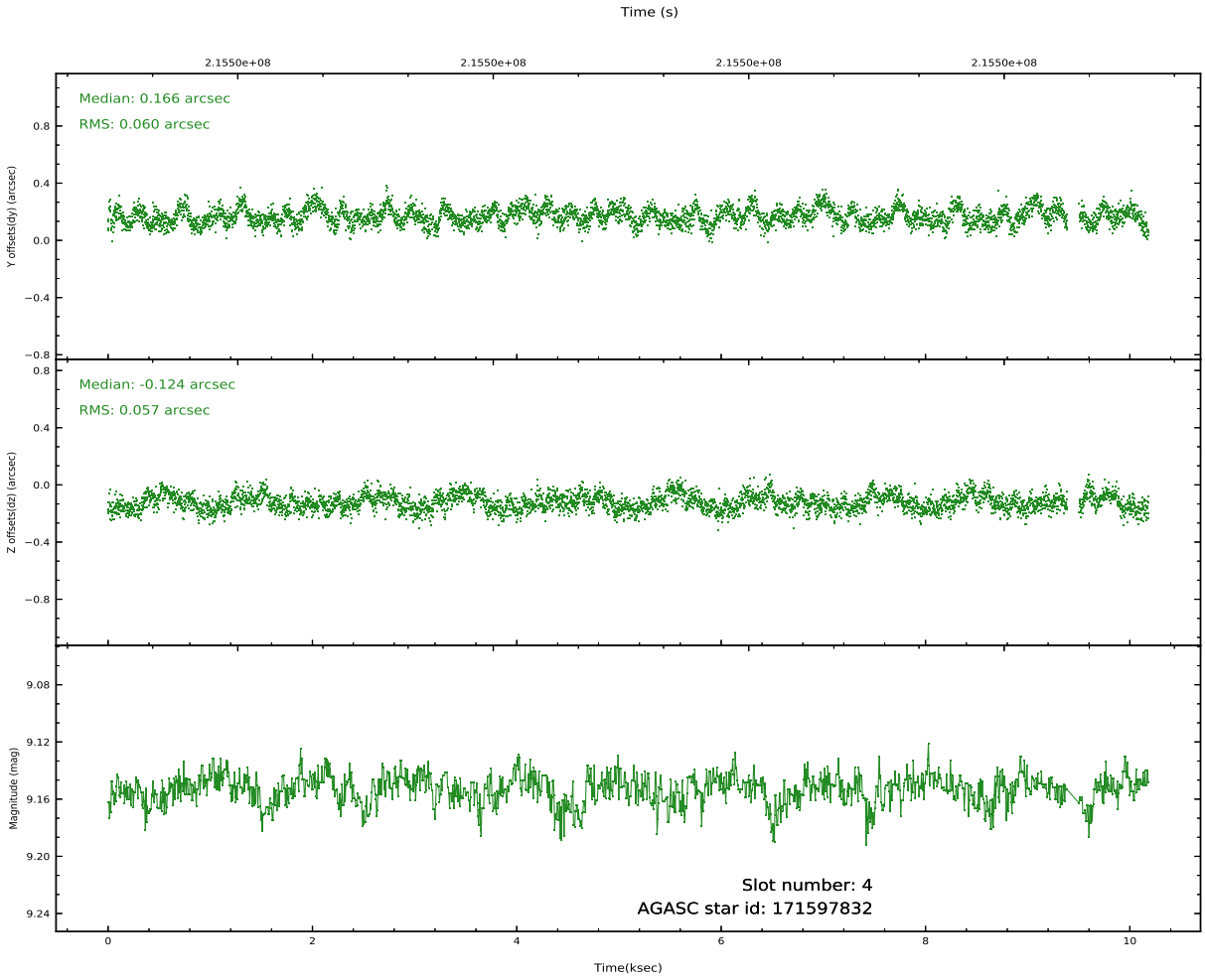




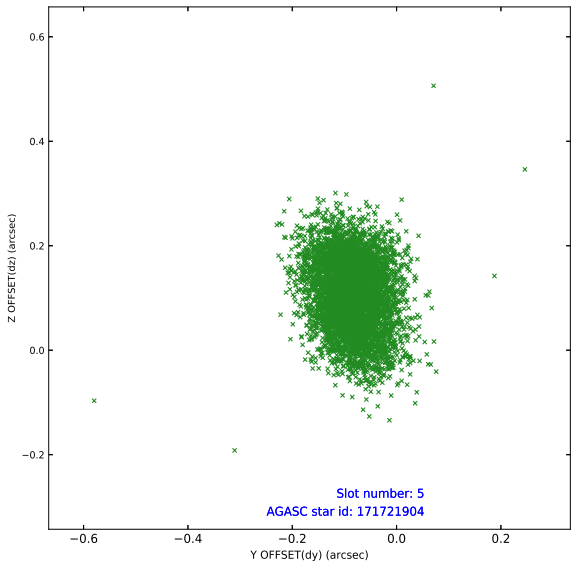
2.4.2 Slot 4

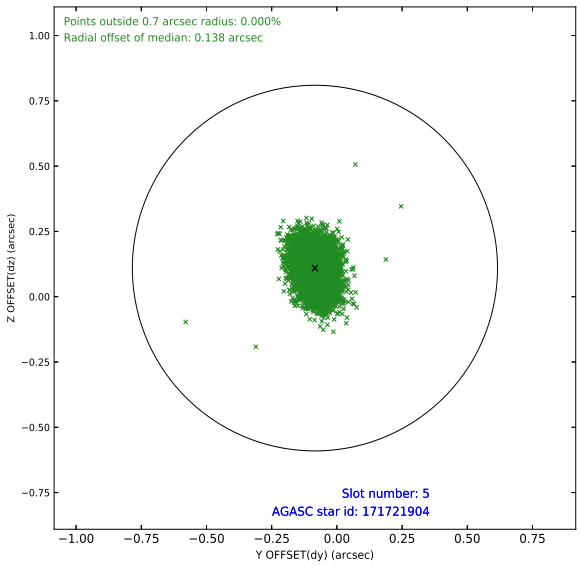

Z OFFSET(dz) (arcsec)
Y OFFSET(dy) (arcsec)
Slot number: 4
AGASC star id: 171597832

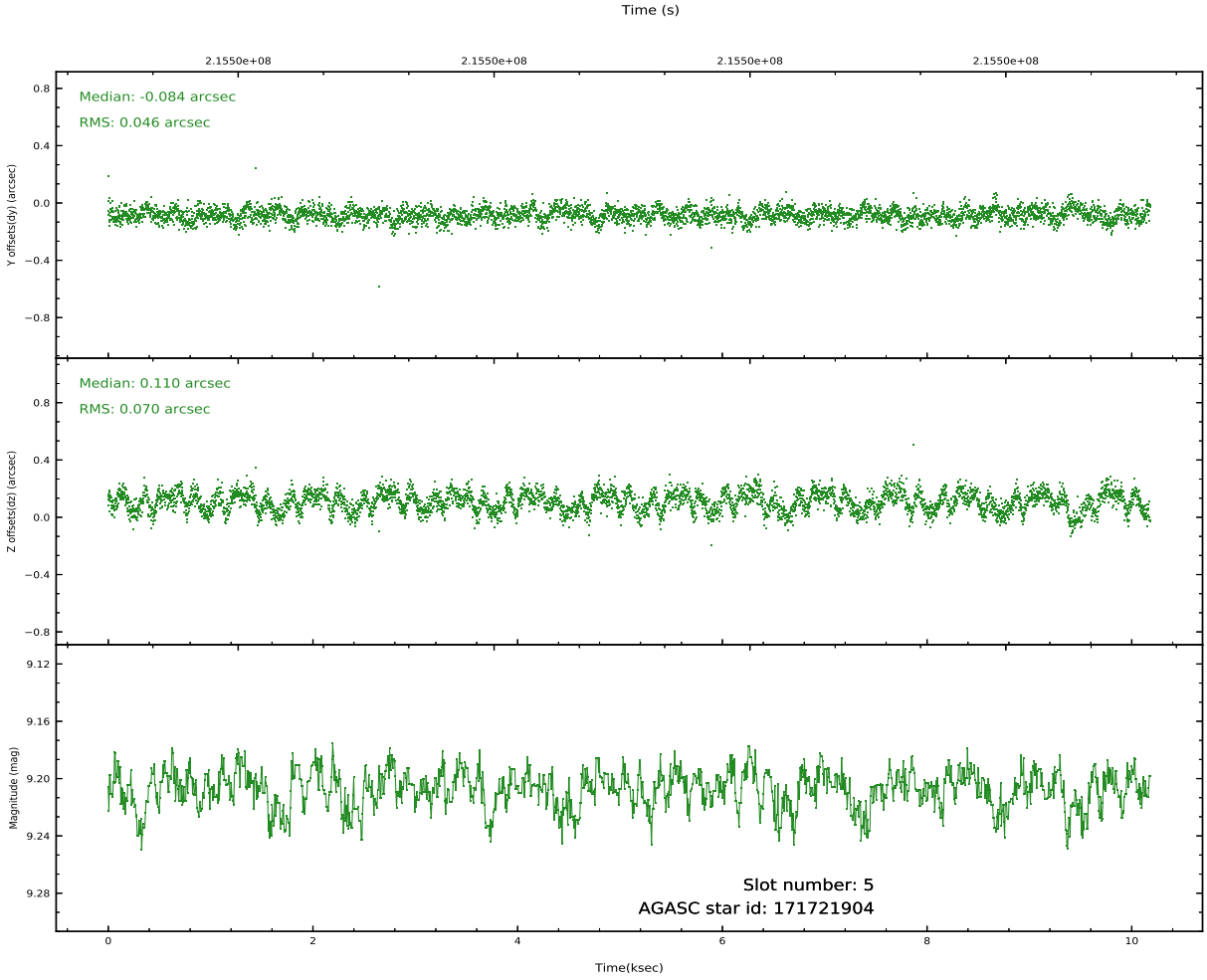

Points outside 0.7 arcsec radius: 0.000%
Radial offset of median: 0.207 arcsec
Z OFFSET(dz) (arcsec)
Y OFFSET(dy) (arcsec)
Slot number: 4
AGASC star id: 171597832


Time (s)
2.1550e+08
Median: 0.166 arcsec
RMS: 0.060 arcsec
Y offsets(dy) (arcsec)
Median: -0.124 arcsec
RMS: 0.057 arcsec
Z offsets(dz) (arcsec)
Magnitude (mag)
Slot number: 4
AGASC star id: 171597832
Time(ksec)

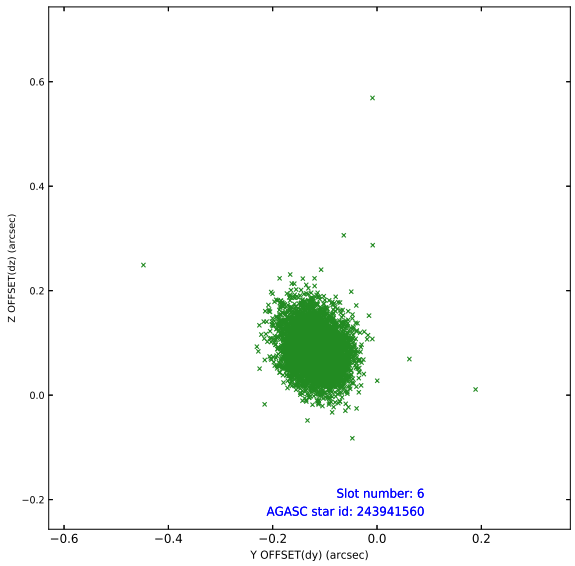
2.4.3 Slot 5

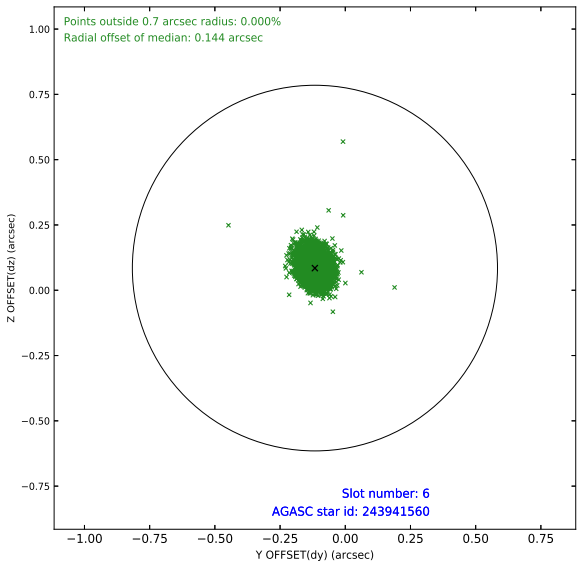

Z OFFSET(dz) (arcsec)
Y OFFSET(dy) (arcsec)
Slot number: 5
AGASC star id: 171721904

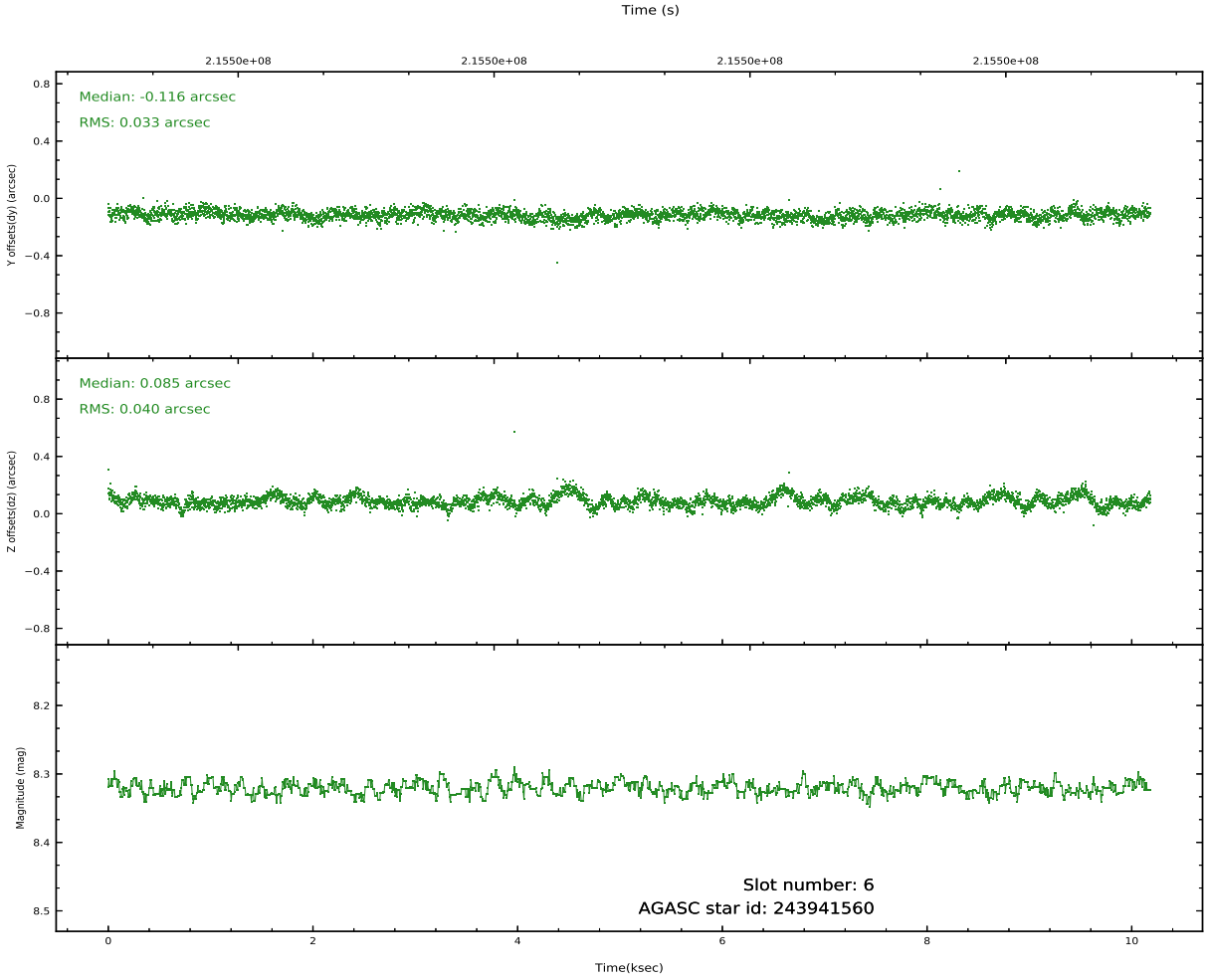

Points outside 0.7 arcsec radius: 0.000%
Radial offset of median: 0.138 arcsec
Z OFFSET(dz) (arcsec)
Y OFFSET(dy) (arcsec)
Slot number: 5
AGASC star id: 171721904


Time (s)
2.1550e+08
Median: -0.084 arcsec
RMS: 0.046 arcsec
Y offsets(dy) (arcsec)
Median: 0.110 arcsec
RMS: 0.070 arcsec
Z offsets(dz) (arcsec)
Magnitude (mag)
Slot number: 5
AGASC star id: 171721904
Time(ksec)

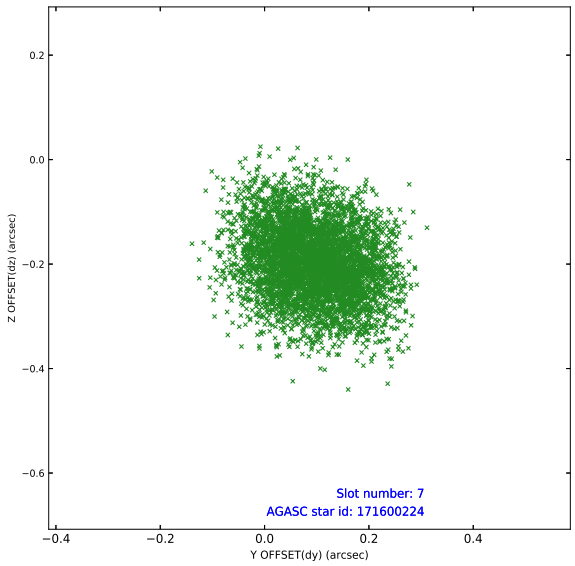
2.4.4 Slot 6

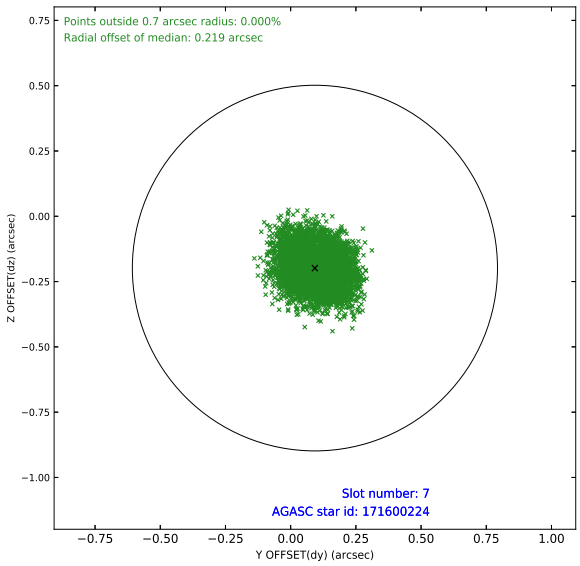

Z OFFSET(dz) (arcsec)
Y OFFSET(dy) (arcsec)
Slot number: 6
AGASC star id: 243941560

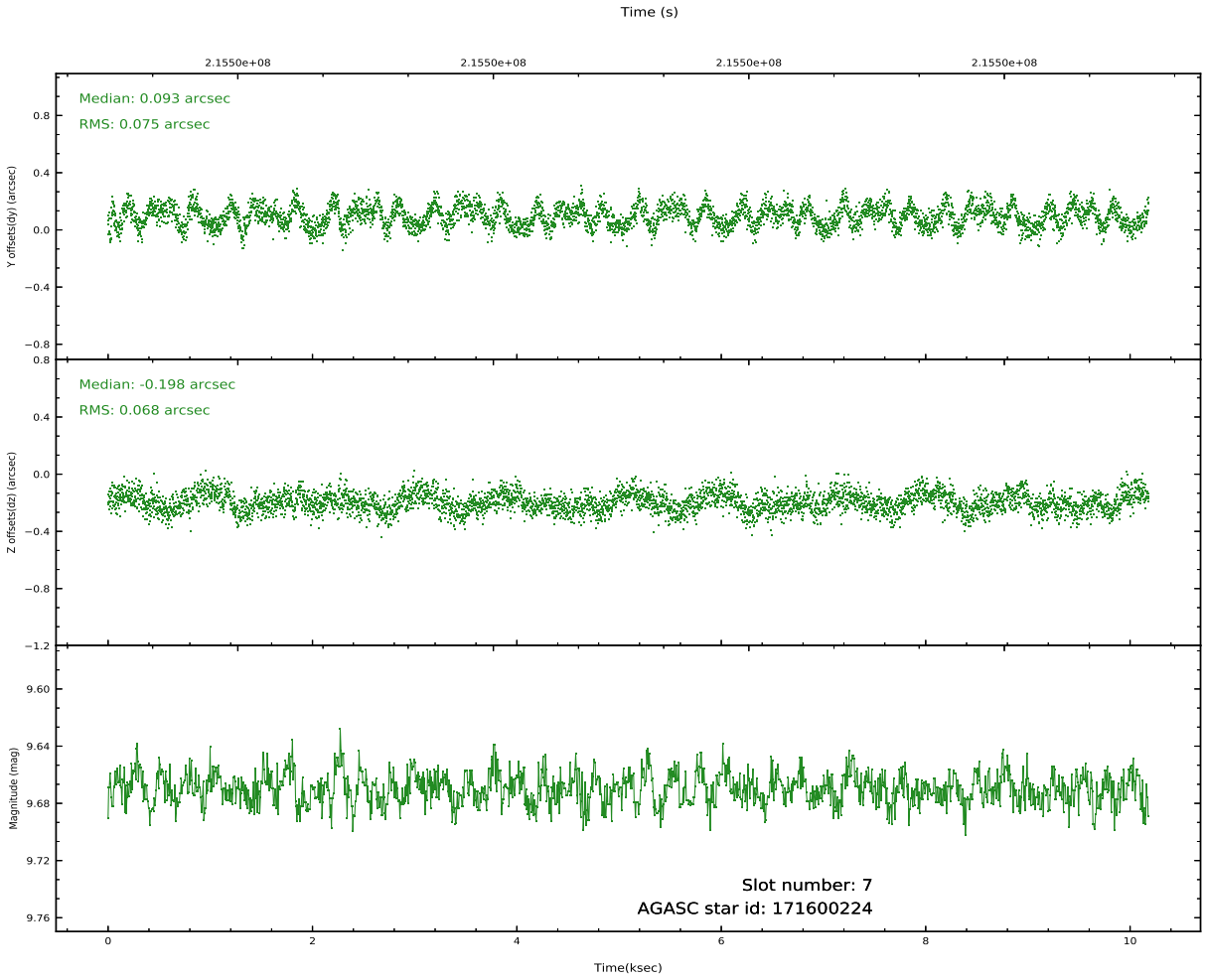

Points outside 0.7 arcsec radius: 0.000%
Radial offset of median: 0.144 arcsec
Z OFFSET(dz) (arcsec)
Y OFFSET(dy) (arcsec)
Slot number: 6
AGASC star id: 243941560


Time (s)
2.1550e+08
Median: -0.116 arcsec
RMS: 0.033 arcsec
Y offsets(dy) (arcsec)
Median: 0.085 arcsec
RMS: 0.040 arcsec
Z offsets(dz) (arcsec)
Magnitude (mag)
Slot number: 6
AGASC star id: 243941560
Time(ksec)

2.4.5 Slot 7

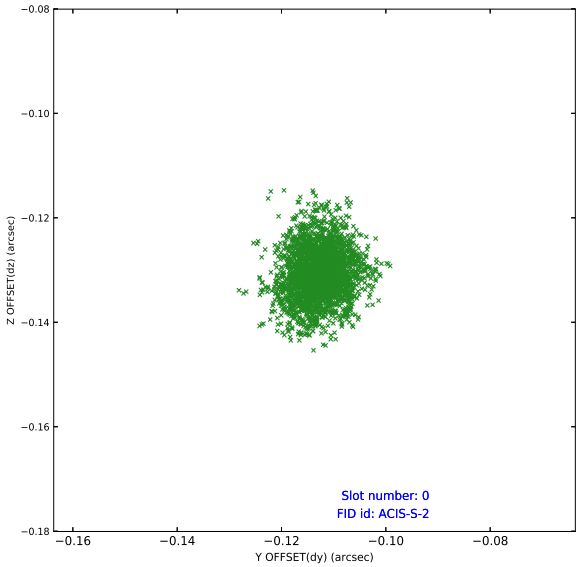

Z OFFSET(dz) (arcsec)
Y OFFSET(dy) (arcsec)
Slot number: 7
AGASC star id: 171600224

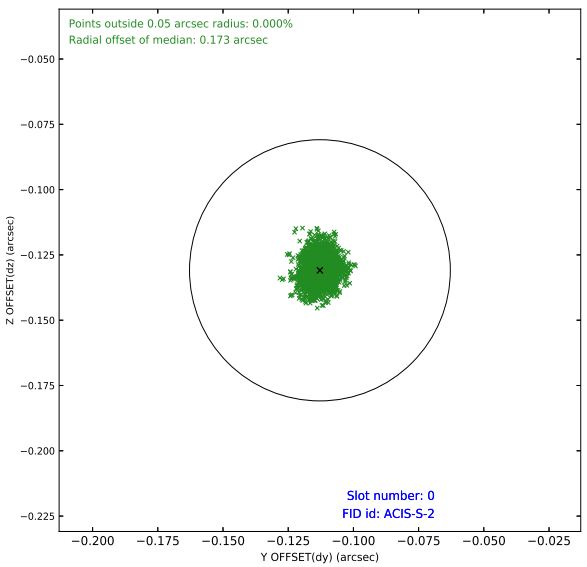

Points outside 0.7 arcsec radius: 0.000%
Radial offset of median: 0.219 arcsec
Z OFFSET(dz) (arcsec)
Y OFFSET(dy) (arcsec)
Slot number: 7
AGASC star id: 171600224

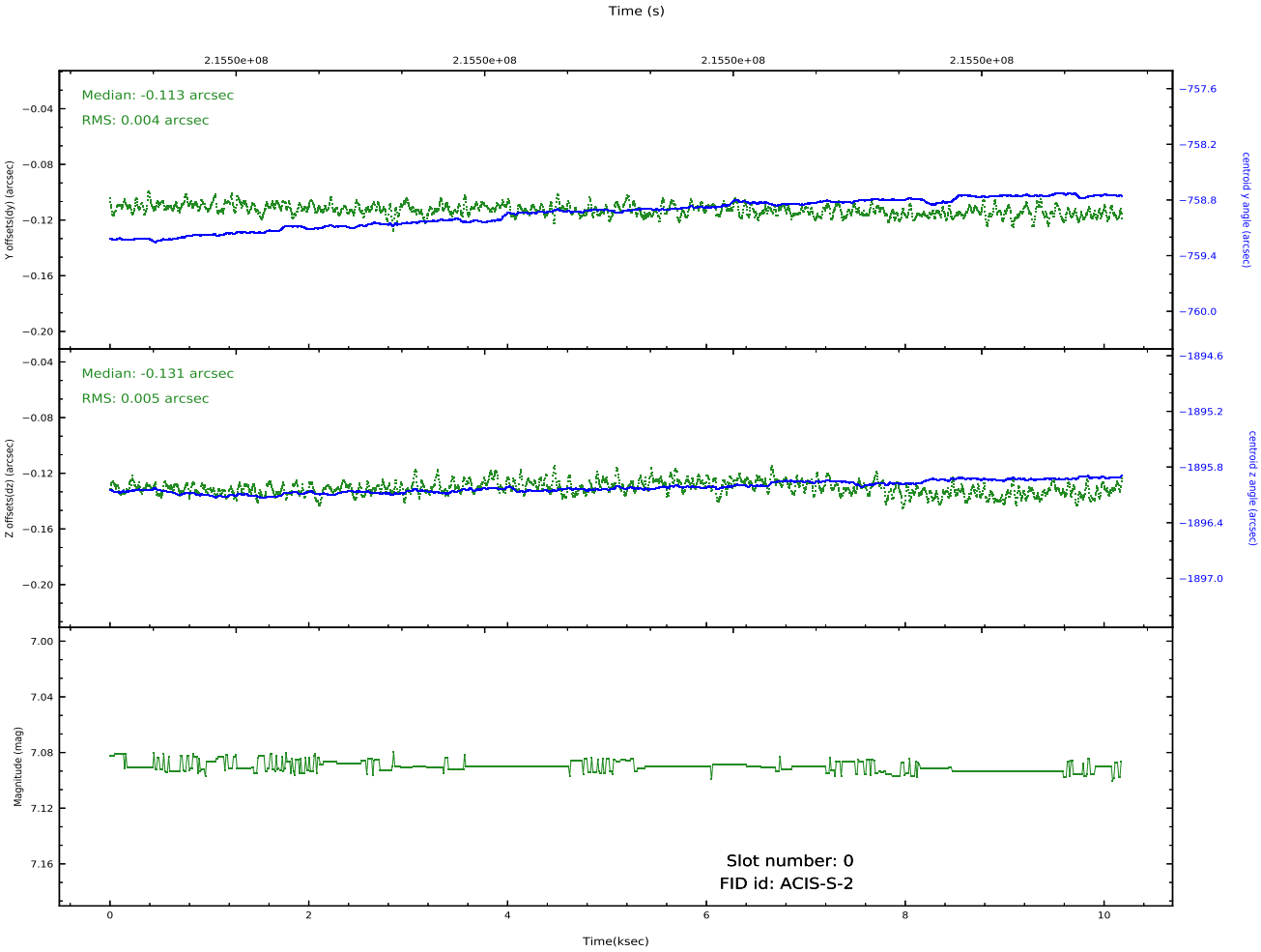

Time (s)
2.1550e+08
Median: 0.093 arcsec
RMS: 0.075 arcsec
Y offsets(dy) (arcsec)
Median: -0.198 arcsec
RMS: 0.068 arcsec
Z offsets(dz) (arcsec)
Magnitude (mag)
Slot number: 7
AGASC star id: 171600224
Time(ksec)

2.5 FID Slots

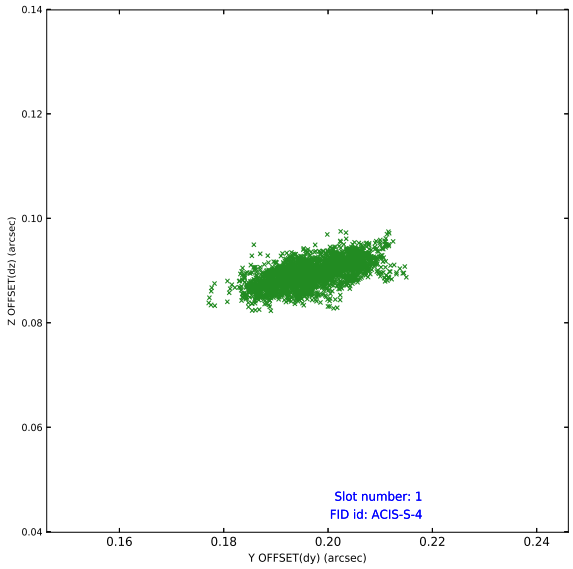
2.5.1 Slot 0

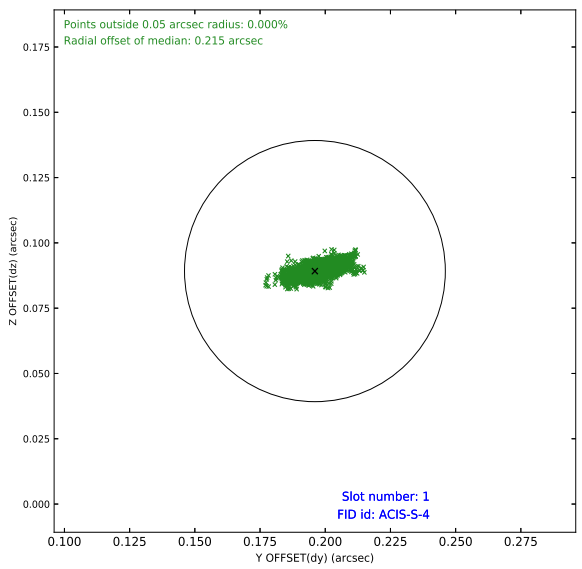


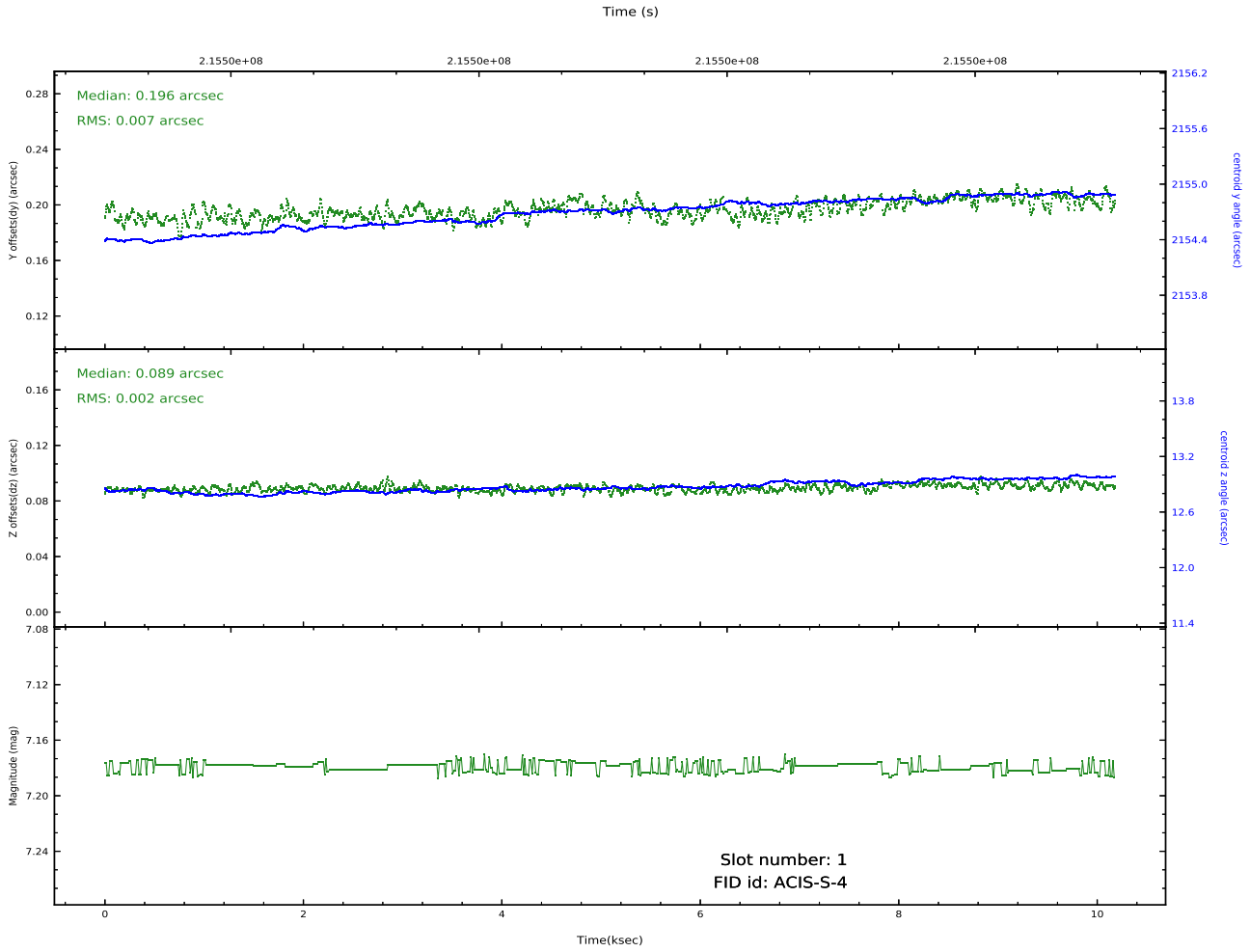




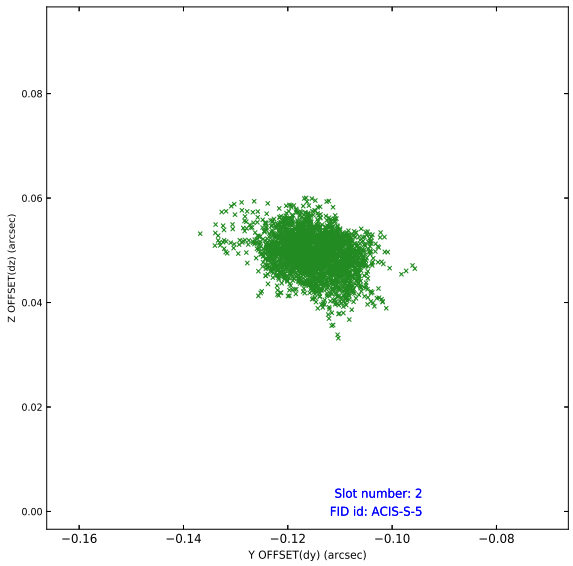
2.5.2 Slot 1

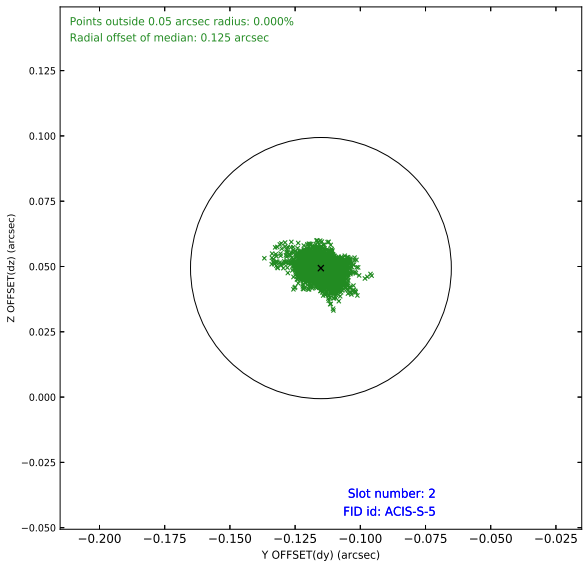

Z OFFSET(dz) (arcsec)
Y OFFSET(dy) (arcsec)
Slot number: 1
FID id: ACIS-S-4

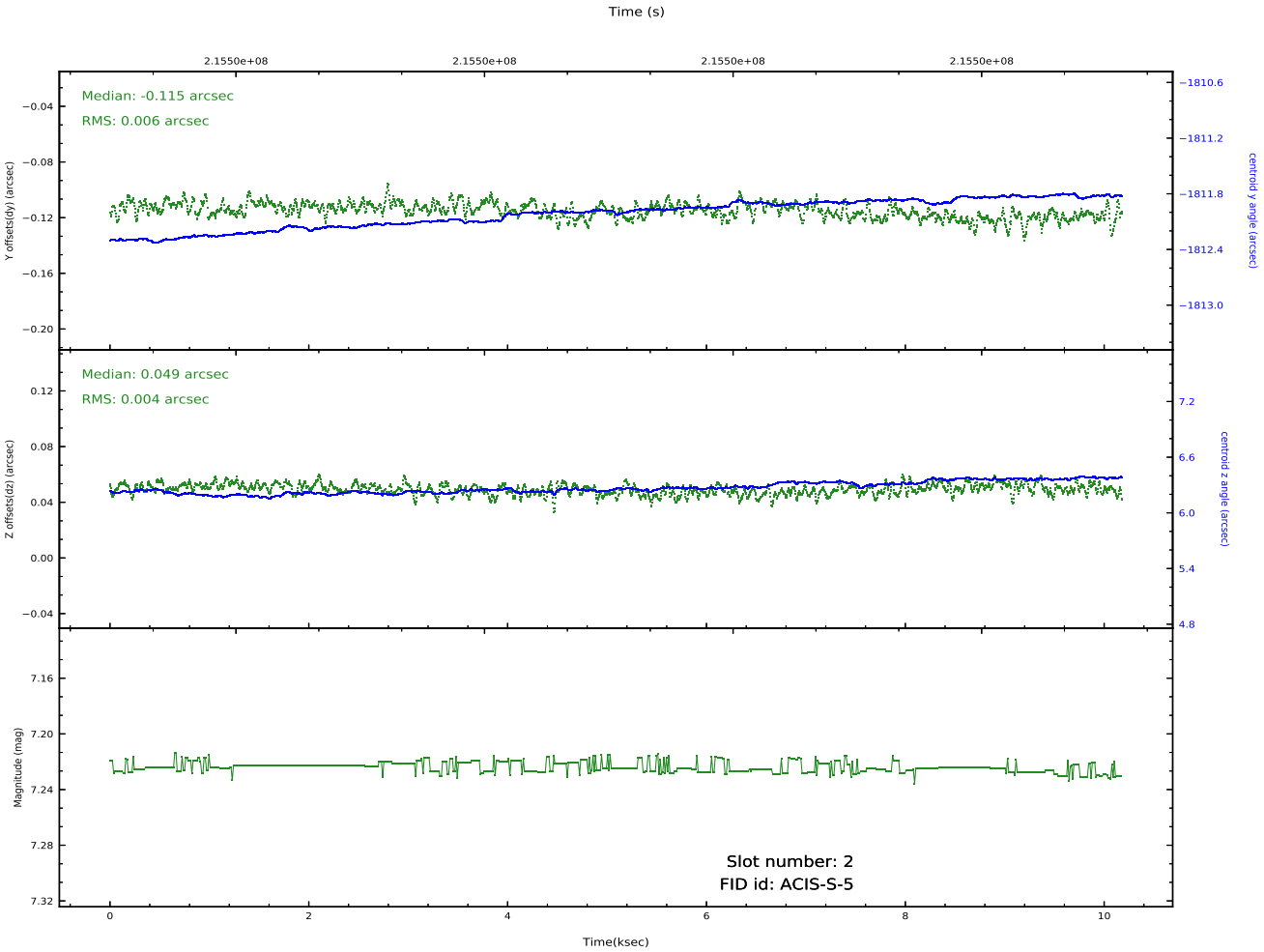

Points outside 0.05 arcsec radius: 0.000%
Radial offset of median: 0.215 arcsec
Z OFFSET(dz) (arcsec)
Y OFFSET(dy) (arcsec)
Slot number: 1
FID id: ACIS-S-4


Time (s)
Median: 0.196 arcsec
RMS: 0.007 arcsec
Y offsets(dy) (arcsec)
centroid y angle (arcsec)
Median: 0.089 arcsec
RMS: 0.002 arcsec
Z offsets(dz) (arcsec)
centroid z angle (arcsec)
Magnitude (mag)
Slot number: 1
FID id: ACIS-S-4
Time(ksec)

2.5.3 Slot 2


Z OFFSET(dz) (arcsec)
Y OFFSET(dy) (arcsec)
Slot number: 2
FID id: ACIS-S-5

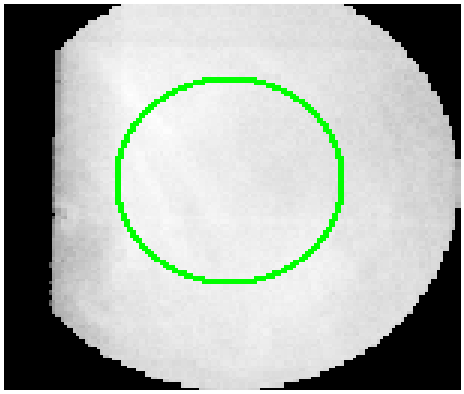

Points outside 0.05 arcsec radius: 0.000%
Radial offset of median: 0.125 arcsec
Z OFFSET(dz) (arcsec)
Y OFFSET(dy) (arcsec)
Slot number: 2
FID id: ACIS-S-5


Time (s)
Median: -0.115 arcsec
RMS: 0.006 arcsec
Y offsets(dy) (arcsec)
centroid y angle (arcsec)
Median: 0.049 arcsec
RMS: 0.004 arcsec
Z offsets(dz) (arcsec)
centroid z angle (arcsec)
Magnitude (mag)
Slot number: 2
FID id: ACIS-S-5
Time(ksec)

3 Gratings

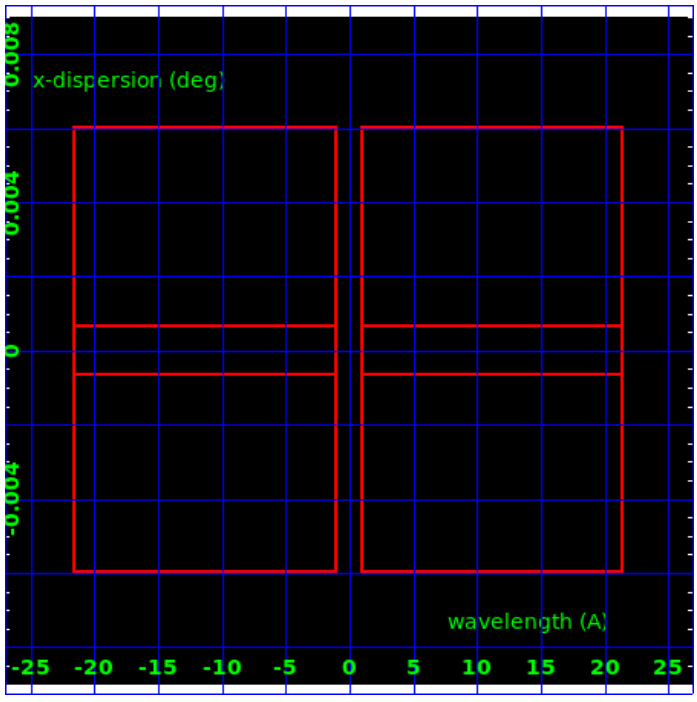
3.1 HEG Arm

HEG Order Sort 123

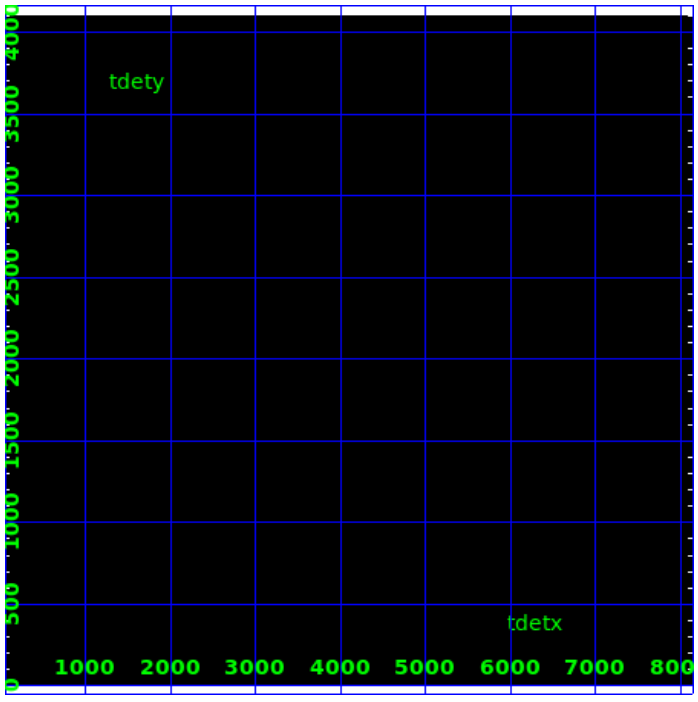


HEG Zero Order

HEG Order Sort ALL

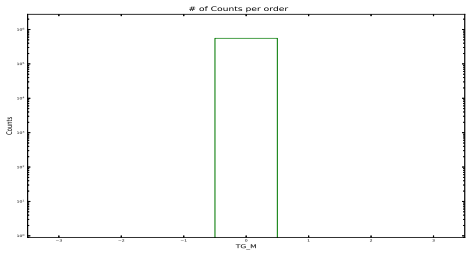


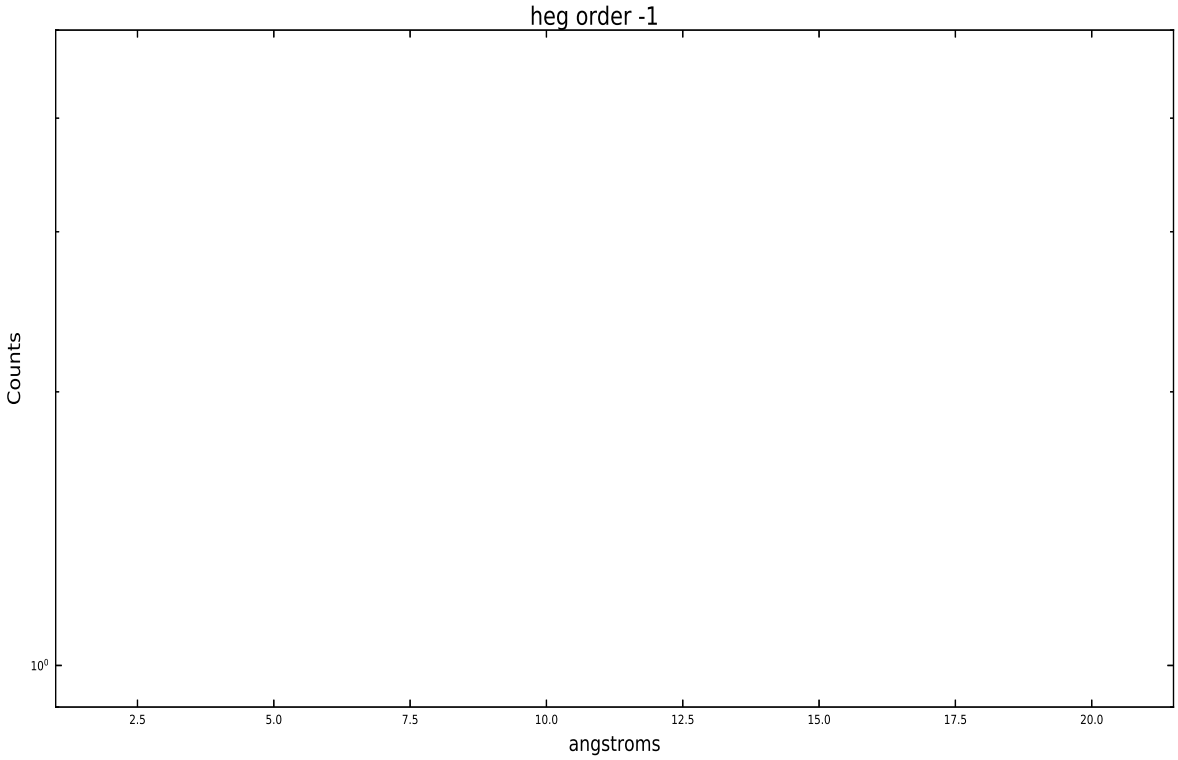
Spot Image HEG

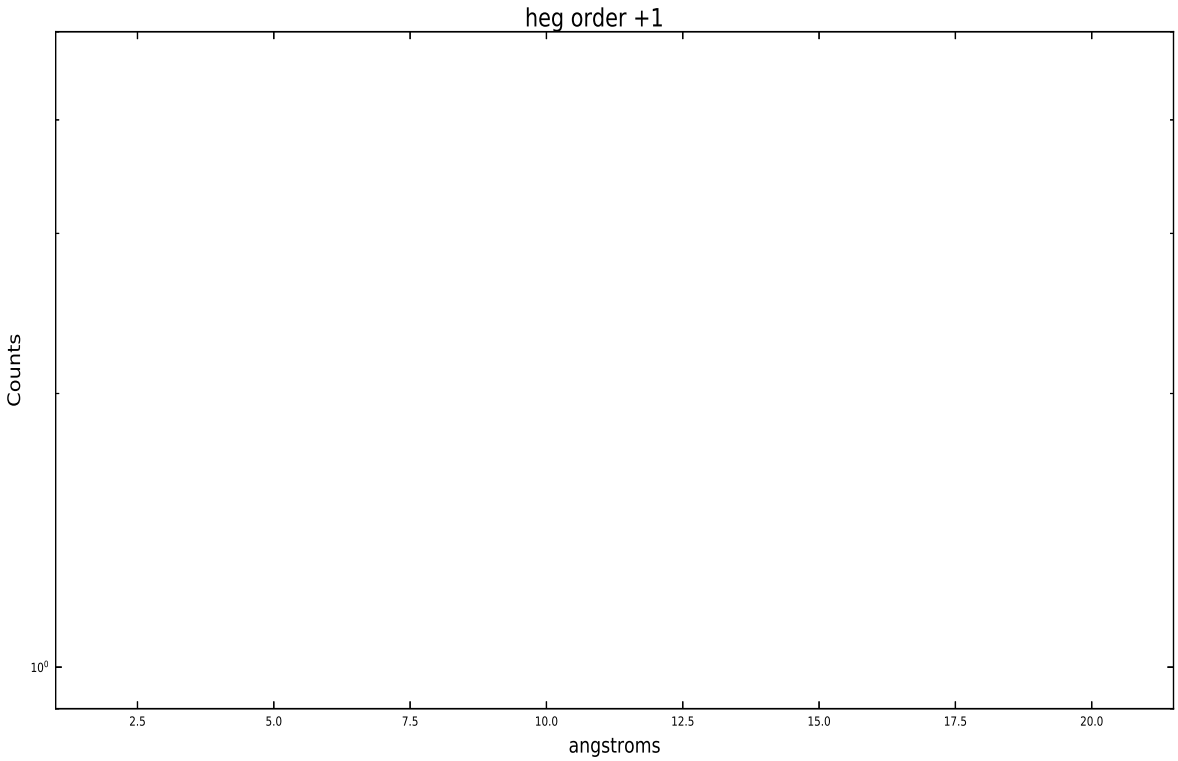


Full Detector HEG

	order -3	order -2	order -1	order 0	order 1	order 2	order 3
Events	0	0	0	553566	0	0	0

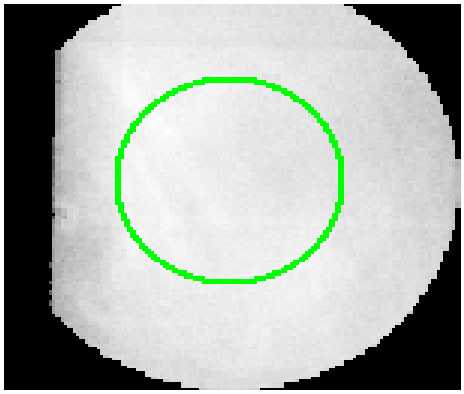



heg order -1
Counts
10^0
2.5
5.0
7.5
10.0
12.5
15.0
17.5
20.0
angstroms


heg order +1
Counts
10^0
2.5
5.0
7.5
10.0
12.5
15.0
17.5
20.0
angstroms

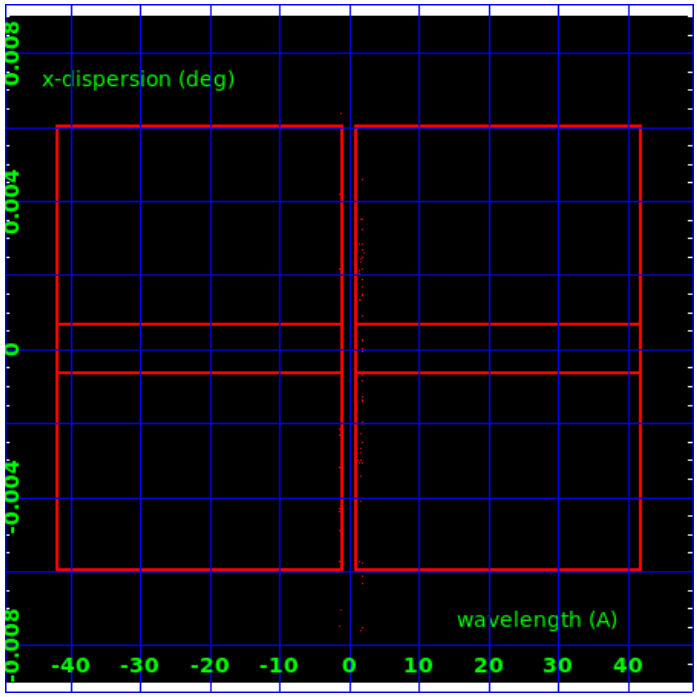
3.2 MEG Arm

MEG Order Sort 123

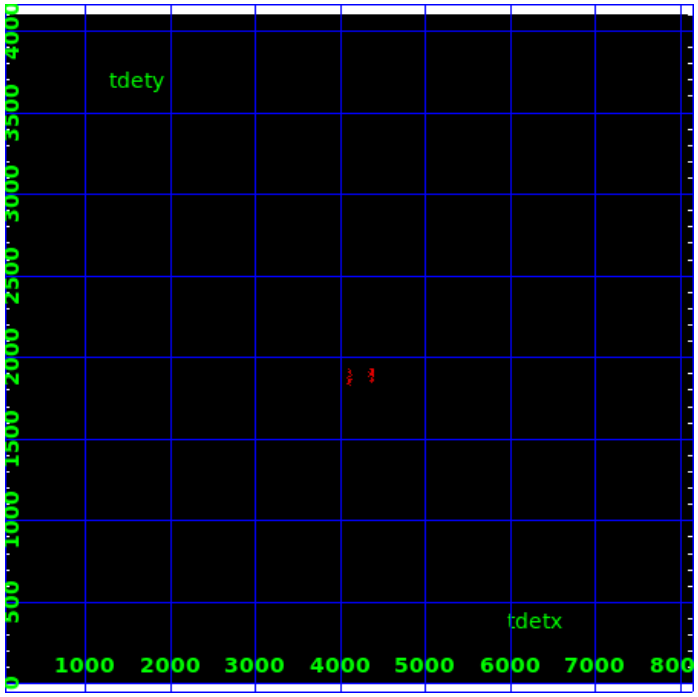


MEG Zero Order

MEG Order Sort ALL

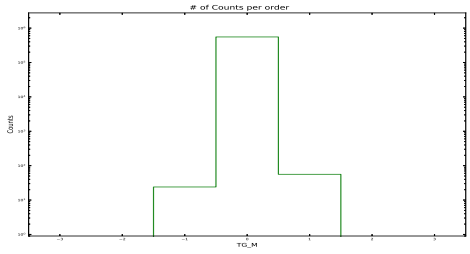


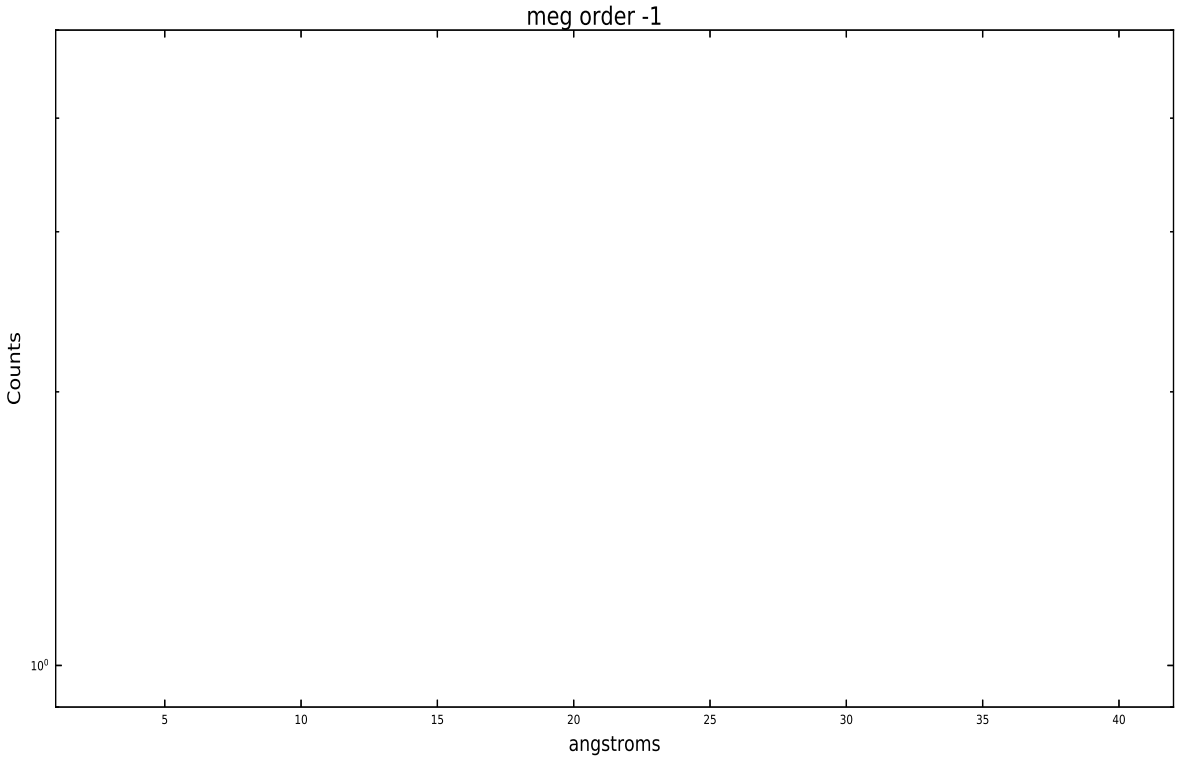
Spot Image MEG

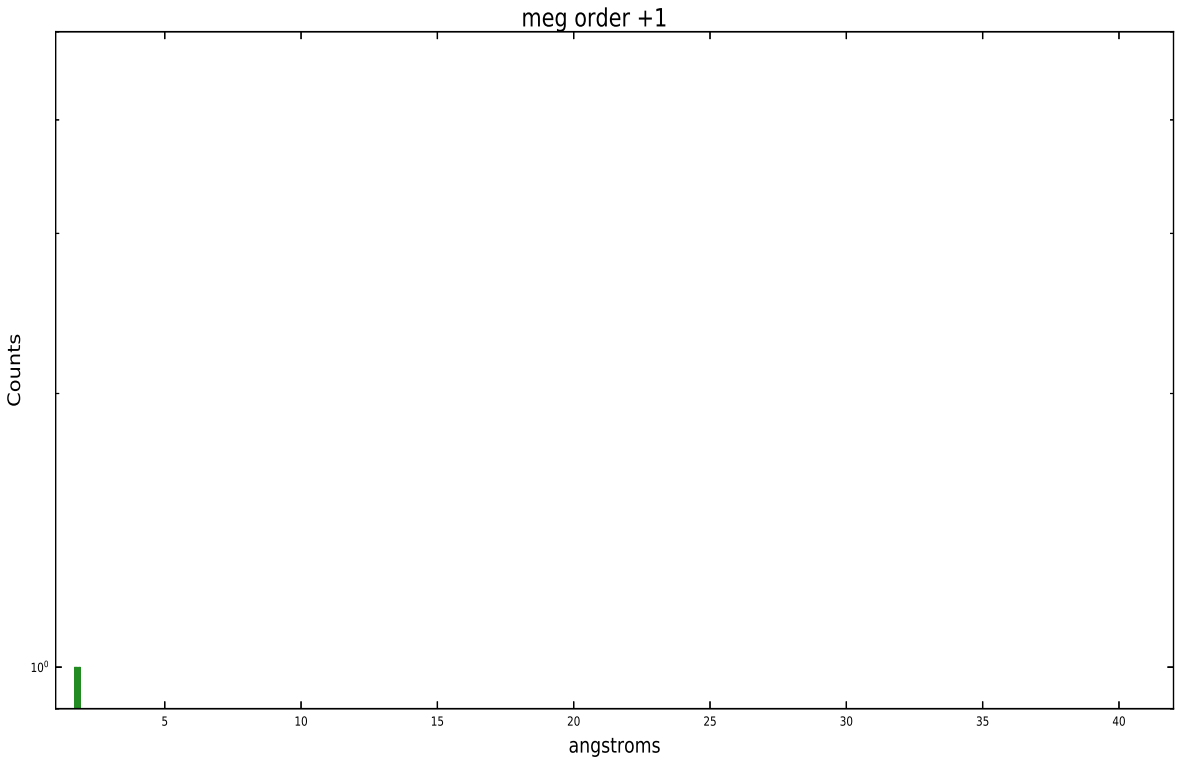


Full Detector MEG

	order -3	order -2	order -1	order 0	order 1	order 2	order 3
Events	0	0	24	553566	56	0	0




meg order -1
Counts
10^0
5
10
15
20
25
30
35
40
angstroms


meg order +1
Counts
10^0
5
10
15
20
25
30
35
40
angstroms

A Summary

A.1 Status

V&V Scientist	Melania Nynka
V&V Date (YYYY-MM-DD)	2020.10.08
V&V Edition	1
V&V Disposition and Status	OK
V&V Charge Time	10.181

A.2 Comments

HETG is inserted as a filter; there is very little useful gratings information in the observation. The zeroth order position used in the grating extraction is NOT at the position of the pulsar, but is near a bright emission knot to the SE.